RESEARCH PROPOSAL

KARNAVATI SCHOOL OF DENTISTRY

Title of The Topic	Clinical Evaluation And Parental Satisfaction With Restoration of Primary Molars Using Zirconia and Stainless-Steel Crowns
Name of the student	Dr. Rohan Bhatt
Department of the student	Department of Pediatric & Preventive Dentistry, Karnavati School of Dentistry
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Name of the Guide & Co-investigator	Dr. Dipti Shah

INTRODUCTION

Early Childhood Caries (ECC) has been termed a silent epidemic by national data, suggesting 30% of pre-schoolers have caries. [1]A challenging role for a paediatric dentist is to maintain primary dentition till the normal age of exfoliation. Children complaining of dental pain are widely seen in the population. Pulpally treated primary teeth remain functional only after placement of proper coronal seal. A crown helps to maintain a proper hermetic seal and mainly provides strength to the remaining tooth structure. Many different types of crowns are now available. Due to parents' increased involvement in clinical decision-making, dental professionals who treat children frequently encounter parental influence while choosing dental restorations.[2]

Numerous full coronal aesthetic restorations are also being promoted as the management of traumatized/carious teeth has undergone a paradigm change over the years from extractions to restoring the teeth to their full functional potential. [3-5] There are numerous options for all-ceramic systems today. Their microstructure (predominantly glassy ceramics, particle-filled glasses, and polycrystalline ceramics), manufacturing process, and therapeutic use are where they largely diverge.[6-7]
Numerous techniques have been developed as a result of the significant demand for aesthetic repair of anterior teeth. Types of dental crowns, including pre-veneered stainless-steel crowns, open-faced steel crowns, resin composite strip crowns and zirconia crowns are available.[8–9] Each of these restorations has advantages and disadvantages.
To begin with, the Rocky Mountain Company introduced stainless steel crowns (SSCs) to paediatric dentistry in 1947. For ages, they have outperformed other materials such as amalgam and composite and became the least likely restoration to require re-treatment. While durability is of high significance, the aesthetic outcome is not; purely because they are stainless steel crowns so they give a metallic look.[10-11]

Parents now have higher expectations for aesthetics, which has led to an increase in demand for paediatric dental restorations that are tooth-coloured. One of the most crucial determining factors in choosing a dental restoration for children is to meet these parental expectations. Parental approval for any repair treatment for children in the modern era is frequently based on aesthetics, toxicity, durability, and expense.[12]

Webber and associates invented the strip crown in 1979. This crown is recommended for front teeth with significant deterioration and fractures. Their main benefits are that they are simple to fit and trim, quick and simple to remove, easily match with natural dentition, give a smooth shiny surface, have easy shade control with composite, are superior aesthetically, economically, and functionally. However, they are contraindicated for severely decayed and loss of tooth structure as well as periodontal disease. However, strip crowns require certain skills and saliva or blood contamination from moisture can affect the binding and change the tone or colour of the material.[13]

Zirconia has a wide range of applications, according to scientific literature.[14–18] Clinical investigations have shown that zirconia-based crowns are considered to be successful restorations in the anterior and posterior dentition with excellent clinical short-term survival. However, glassy ceramic must be used to veneer the opaque white colour of zirconia since failure or chipping of the ceramic veneer has been shown to be a major drawback. Since it has been used successfully in adult dentistry for more than ten years, zirconia has been applied in pediatric dentistry as a more long-lasting and attractive substitute. The first pediatric zirconia crown to be made commercially available in the US was EZ-pedo, which debuted in 2008. NuSmile, Kinder Crowns, Signature Crowns, and other zirconia crowns are additionally offered in the marketplace. The advantages of this zirconia crown over a resin strip crown include the promise of great aesthetics, complete coverage of the treated tooth, and perhaps a less sensitive approach for cementation. The cost of the zirconia crown, the inability to crimp the crown for mechanical retention, the difficulty to modify the color of the crown, and the requirement for more tooth reduction than with a conventional preformed metal crown are potential drawbacks of the material.[1]

AIM AND OBJECTIVES

Aim:

1. The aim of the study is to evaluate the clinical outcome and parental satisfaction of performing restoration using Zirconia and Stainless-Steel crowns on primary molars.

Objectives:

1. To evaluate Crown retention, crown fracture, gingival index, crown contour,opposing tooth wear, marginal integrity and recurrent caries using zirconia crowns
2. To evaluate Crown retention, gingival index, crown contour, opposing tooth wear,marginal integrity and recurrent caries using Stainless Steel crowns
3. To determine and compare the parental ratings of impact of treatment usingzirconia crowns and stainless steel crown restoration of primary molars
4. To compare clinical success of zirconia and stainless steel crown
5. To determine and compare child's ratings for the cemented crown

REVIEW OF LITERATURE

1. Purvi V.Shah (2004)[21]

Carried out a study to evaluate the clinical success of and parental satisfaction with treatment using prefabricated resin-faced stainless-steel crowns (SSCs; Kinder Krowns, Mayclin Dental Studios, Minneapolis, Minn) on anterior primary teeth. A retrospective cross-sectional study was performed and 50 eligible participants were selected from which 12 children participated. Clinicalevaluation was performed for crown retention, facing retention, and resin veneerwear. The authors concluded that Kinder Krown prefabricated resin-faced SSCsshowed a low failure rate, and the parental satisfaction with treatment was positive.

2. Ari Kupietzky, William F. waggoner (2004)[22]

Conducted a study to assess patient and parent satisfaction with the treatment of maxillary anterior primary incisors with bonded resin composite strip crowns. Patients who had strip crowns installed on their maxillary primary incisors were the subject of this retrospective clinical investigation. In 40 kids, 112 repairs were made. Despite giving the colour, size, and general look of the children a low assessment, parents reported overall good satisfaction. But it was discovered that overall pleasure and durability had a substantial relationship. Parental satisfaction with the bond resin composite strip crown for the treatment of primary incisors with large/multiple surface cavities was excellent, according to the author

3. Schüler IM (2013) [23]

Conducted a study to evaluate the quality of stainless steel crowns (SSCs) installed in children at high risk for developing caries after 1, 3, and 5 years of use. Any SSC who had 1, 3, or 5 years of survival at the time of a dental consultation during the evaluation period of September 2007 to March 2008 was included in this study. 171 kids had clinical evaluations of all 428 SSCs. SSCs can be advised for the restoration of carious primary teeth in children with high caries risk in order to assure long-term clinical success, according to thorough evaluation research. SSCs are restorations with high clinical success rates after a service period of up to 5 years, regardless of the patient's migration history or caries risk, the crown's marginal adaptation, proximal contacts, the severity of caries, or the pulp treatment of the tooth.

4. Thomas Stober (2013) [24]

Conducted a study to assess the amount of enamel wear brought on by monolithic zirconia crowns and to contrast that amount with the amount of enamel wear brought on by contralateral natural antagonists. Individuals underwent screening of which twenty individuals who needed full molar crowns were chosen. In order to gauge wear, impressions were taken with a six-month follow-up. Two-sided paired Student's t-tests and linear regression analysis were used to assess wear differences. Based on the research, the author came to the conclusion that monolithic zirconia crowns cause opposing enamel to wear down more quickly than normal teeth do. Although the degree of antagonistic enamel attrition after 6 months was comparable to, or even lower than, that generated by other ceramic materials in the prior research, the clinical use of monolithic zirconia crowns looked justified.

5) Walia T. et al (2014)[5]

A randomised control experiment of three attractive complete coronal restorations was performed on deciduous maxillary teeth. 39 kids, aged 3-5, with 129 teeth total were divided into three groups (one group for resin composite strip crown, one group for zirconia, one group for pre veneered stainless steel crown). The author came to the conclusion that the resin composite strip crown technique is extremely sensitive and results in a reduced restoration rate. The incidence of facial veneer fracture was higher in the pre-veneered SSC. Despite being highly retentive and biocompatible, zirconia crowns produce only little abrasion of the opposing natural teeth at the 6-month mark.

6. Daniel M.holsinger(2015)[25]

Conducted a study to gauge parental satisfaction and the clinical efficacy of anterior pediatric zirconia crowns. A retrospective study was conducted on 18 kids, and 57 crowns in all were found. Crowns were assessed for retention, gingival health, color adequacy, shape, marginal integrity, and wear on neighbouring teeth. A questionnaire was used to assess how pleased parents were with the aesthetics of the crowns and how they felt the procedure had improved their child's appearance and oral health. Parents expressed great happiness with the color, size, and shape of the crowns, and the study found that the crowns enhanced their child's look and oral health. According to 89% of parents, they would highly recommend these crowns. therefore, zirconia crowns have the ability to please parents.

7. Anas Al salami (2015)[6]

Conducted a study to determine how satisfied parents were with the three-tooth colored complete coronal restorations on their child's primary maxillary incisors. 39 kids participated, and 129 teeth were chosen for three crowns (resin composite strip crown, pre veneered stainless steel crown, prefabricated zirconia crown). The crown's size, colour, shape, durability, overall contentment, and level of pain and discomfort all played a role in the parents' approval. The author came to the conclusion that pre veneered ssc had the lowest reported parental satisfaction, followed by resin composite strip crowns and zirconia primary crowns.

8. Rafiullah Bashri (2015)[26]

Conducted a study to compare and assess parental satisfaction with three different types of prefabricated primary crowns for maxillary primary incisor restoration: resin composite strip crowns, pre-veneered stainless steel crowns, and recently introduced pre-fabricated primary zirconia crowns. 39 kids were randomly divided into three groups for a prospective clinical trial and had carious or traumatic primary maxillary incisors. Each person got one of the full-coronal repairs. After one year, children were asked to complete a questionnaire to compare and rate their parents' happiness with the performance of their crowns. According to the study, pre-veneered stainless steel crowns had the lowest reported parental overall satisfaction, whereas zirconia crowns had the greatest.

9. Larkin Clark (2016) [27]

This study assessed the abrasiveness of primary tooth preparation using various zirconia and stainless steel brands. One hundred primary typhodont samples were collected and sorted into five groups. There were 10 samples of anterior and 10 samples of posterior teeth in each group. Each tooth underwent three separate ten thousandths of a gramme weighings. Each tooth's zirconia and stainless-steel crown was measured for size and individually prepared by a single operator for the restorations. The study's authors came to the conclusion that zirconia crowns needed more tooth reduction than stainless steel crowns.

Daniel M. Holsinger (2016) [28]

Conducted a study to gauge parental satisfaction with anterior paediatric zirconia crowns and their clinical effectiveness. 18 kids were the subject of a retrospective investigation, which revealed 57 crowns in all. The retention, gingival health, colour adequacy, shape, marginal integrity, and wear on the opposing teeth of the crowns were assessed. A questionnaire was used to assess parental satisfaction with the aesthetics of the crowns and their impression of how the therapy affected the child's appearance and oral health. The study found that parents had a high level of satisfaction with the colour, size, and shape of the crowns and that the crowns had a positive impact on their child's look and dental health. Parents stated that they would highly suggest these crowns 89% of the time.

Divya Subramanyam (2018) [29]

Conducted a study to compare the clinical evaluation of KIDS strip crowns with 3M crowns on primary anterior teeth and parental satisfaction. For this study, two groups of 15 people each were chosen from a total of 30 participants. The Color, size, form, and look of the crowns served as the study's clinical parameters. The author came to the conclusion that both groups' parental satisfaction and overall clinical success were determined to be comparable. In primary anterior teeth, KIDS strip crowns can be used as an alternate restoration to 3M ESPE crowns.

MATERIAL AND METHODS

Source Of Data:

Children who are accompanied by parents, guardians, caretakers or next to their kin report to the OPD of the Department of pedodontics and preventive dentistry, Karnavati School of Dentistry, Gandhinagar, Gujarat.

Method Of Data Collection:

The proposed study will be a randomized clinical trial in the Department of Pedodontics & Preventive Dentistry, Karnavati School of Dentistry. Prior written consent will be obtained from the ethics committee and parents of the selected children for the study.
After considering all the Inclusion and Exclusion criteria, a total of 120 participants will be selected for the study. The sample size will further be divided into two groups, with 60 participants in each group. The subjects were randomly allocated to one of the following groups. The baseline gingival index will be assessed according to Loe and Sillness gingival index.

Group A: Stainless steel crowns for primary molars
Group B: Zirconia Crowns for primary molars

Inclusion And Exclusion Criteria

A) Inclusion criteria:

1. Primary molar with extensive carious lesions
2. Restorable primary molars
3. Primary molars requiring pulp therapy or already pulp treated
4. Presence of natural (not crowned) opposing antagonist
5. Good oral health
6. Adequate root support with no mobility
7. Class 2 cavity with marginal ridge fracture
8. Age group: 4-8 years

B) Exclusion criteria:

1. Primary teeth with enamel dentin defects
2. Child below 4 and above 8 years of age
3. Primary molars which cannot be restored
4. Primary molars used as abutment for space maintainer
5. Presence of bruxism /traumatic malocclusion
6. Children with special needs
7. Any habits(mouth breathing , thumb sucking)
8. Patient not signing consent

Statistical Analysis

The data will be analysed with IBM SPSS 20 for windows statistical software. An appropriate statistical analysis test will be applied accordingly to analyse the data. For all statistical analyses, probability levels of $P<0.05$ will be considered statistically significant.

Signature of Principal Investigator

Signature of Co-investigator/PhD Guide